

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN AND RELATING TO COSMETICS

(71) We, WELLA AKTIENGESSELLSCHAFT, a German Company, of Berliner Allee 65, 61 Darmstadt, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to cosmetics of the kind based on a keratin softening active substance and a swelling and penetrating agent.

The action of many cosmetic preparations such as for example hair shaping agents, depilatories or various skin treatment media, is based on a softening of the scleroproteins of the hair or skin. To this end, alkalies, mercapto compounds, sulphites or sulphides are mostly used as the active substances. In order to achieve a sufficient effect, however, it is often necessary to use the active substances in a relatively high concentration, so that the cosmetic preparations lie at the extreme limit of their physiological tolerance.

Various active substances such as for example sulphites and the mercapto compound monothioglycol acid glycerin ester, are employed in hair waving media which are adjusted to a pH value of 6, only when high temperatures (above 60°C) are applied to an adequate extent at the same time. Alkali thioglycolates in depilatories only prove sufficiently active at a thioglycol acid concentration of more than 3%, this efficacy being however open to only very negligible increases up to a thioglycol acid concentration of 10%.

Therefore, opportunities have always been sought, where such cosmetic preparations are involved, of finding a composition and mode of application which would achieve the greatest possible efficacy accompanied by deep physiological tolerance. As far as physiological tolerance is concerned, then with regard to the composition of the preparations, the aim is towards lower concentrations of the active substance and adjustment to pH values which can be tolerated by the hair and skin, whereas in terms of application, the aim

is towards shorter periods of action and application at room temperature.

With such preparations, then, in order that powerful efficacy may be achieved at the same time, certain additives which are known as swelling and penetrating substances, are often added to the preparations. These substances are capable of encouraging penetration of the additive substances into the scleroprotein of the hair or skin and of enhancing the efficacy of the preparations in which they are contained.

For example, when such preparations are used, it is possible to achieve satisfactory straightening of hair even if the straightening agent contains only a relatively small concentration of alkali liquor. Furthermore, it is consequently also possible to achieve adequate depilation or removal of calloused layers of skin over a relatively short period of action.

The swelling and penetration substances hitherto employed in cosmetic preparations do however have various disadvantages, so that the results achieved were not always satisfactory. For example, these substances are either difficult to dissolve in water, as is the case for example with melamine, or they are physiologically incompatible, which is the case with formamide for example. Other such substances such as for example alkali or ammonium thiocyanates, are decomposed by subsequent oxidation treatments, forming undesirable subsidiary products or they are relatively easily saponified as is the case with urea.

For example, if urea is used in an acid sulphite-based hair shaping agent (pH=6), then during storage, the pH value of the agent rises due to saponification of the urea, with a formation of ammonium carbonate, the pH value gradually rising to 7 or higher, so that the shaping efficiency of the agent is lost. If the urea is used in an alkaline depilatory (pH=12) based on a sulphide or a mercapto compound, then the urea will likewise gradually saponify forming ammonium carbonate, whereby however as a secondary effect, the

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carbon dioxide becomes bonded by the alkali in the medium and thus the drop in the pH value will reduce the efficacy of the depilatory.

- 5 As has now surprisingly been found, the cosmetics according to the present invention do not have these disadvantages and therefore produce outstanding results.

- 10 The cosmetics according to the invention, based on keratin softening active substances are characterised in that they contain as the swelling and penetrating substance imidazolidinone-(2). This compound is readily soluble in water, physiologically tolerable and resistant both to oxidation and also to saponification. Ready to use cosmetics should generally contain them in amounts of about half to 30% by weight and in particular in a range of concentrations from about 2 to 20% by weight.

- 20 The imidazolidinone-(2) content in the cosmetics has the advantage that they allow the efficacy of these agents to be increased to a substantial degree and that maximum possible physiological tolerance is guaranteed at the same time. Furthermore, the agents have excellent resistance during storage and to all kinds of possibly necessary subsequent treatments, particularly those which have an oxidising effect.

- 30 The cosmetics according to the invention may in particular be permanent waving agents, hair straightening agents, depilatories or preparations intended for beautifying the surface of the skin. Their composition corresponds to the type of preparation conventional with and already known for these agents, and is based on keratin softening active substances. The preparations are characterised in that they contain imidazolidinone-(2) which acts as a swelling and penetrating substance.

- 40 Of these conventional types of preparation which can by way of example be used within the framework of the application, it is intended to explain some hereinafter.

- 45 In the case of agents for the permanent shaping of hair and in fact both for waving and also for straightening of hair, these are in particular aqueous alkaline adjusted preparations which, as keratin softening active substances, contain mercapto carbonic acid salts such as for example ammonium salts of thioglycol acid or thiolactic acid, in a concentration from about 2 to 12% by weight. However, also acid adjusted waving agents may be considered which have in the aqueous medium an effective content of inorganic sulphites or carboxyl group-free mercapto compounds such as hydrophilic esters of thioglycol acid. In the former case, preferably sodium or ammonium sulphite is used in a concentration (calculated as  $\text{SO}_2$ ) of about 3 to 8% by weight. In the latter case, particularly monothioglycol acid-glycol ester or glycerin ester may be used in a concentration

of about 6 to 12% by weight. Furthermore, aqueous alkaline straightening agents based on alkalis such as sodium potassium or lithium hydroxide may be used, at the rate of up to about 2 to 8% by weight.

The form in which the waving agent is prepared is normally that of a liquid, in fact a solution or emulsion, while the straightening agents are ideally creams, gels or pastes.

75 Depilatories used are aqueous alkaline adjusted preparations mostly in the form of creams or gels. As keratin softening substances, they contain inorganic sulphides, particularly strontium sulphide, or salts of mercapto carbonic acids, preferably the alkali or earth alkali salts thereof, in a concentration of about 3 to 10% by weight.

Usable skin treatment media have been described in German Offenlegungsschrift 2,313,794 of the Applicants. The agents which, in an aqueous medium, contain as active substances sulphides, sulphites or mercapto compounds have, according to composition, a pH value in the range from about 6 to 13 and an active substance content of about half to 12% by weight.

The cosmetics according to the invention can of course if necessary all contain conventional and known cosmetic additives such as perfume oils, wetting agents, fillers, thickeners, alcohols, opacifiers, aids to solution, emulsifiers, fats, waxes, oils and other substances.

The object of the invention will be explained in greater detail by the following examples.

#### Examples Example 1

##### Sulphite based permanent waving agent

17.3 g	aqueous solution of ammonium sulphite (34%)	105
13.5 g	sulphurous acid (with 5% $\text{SO}_2$ content in water)	
8.0 g	imidazolidinone-(2)	
4.0 g	isopropanol	110
0.2 g	perfume oil	
0.2 g	octyl phenol oxethylated with 20 mol ethylene oxide	
56.8 g	water	
100.0 g		115

The pH value of the solution is 6.7.

The hair is premoistened with half the waving fluid, wound onto permanent waving curlers and further moistened with the remainder of the waving fluid. The hair is then covered with a plastic film and heat supplied for about 6 minutes by means of a drier hood (set to 55°C). The hair is then rinsed with water, oxidatively fixed in the usual way and given secondary treatment.

## Example 2

## Permanent waving agent based on thioglycol acid ester

5 Since the monothioglycol acid glycerin ester can saponify with water when stored, it is separately packed. Only briefly prior to use is the ester added to an emulsion which contains all the other necessary constituents.

## A.

10 16.0 g monothioglycol acid glycerin ester

## B.

5.0 g imidazolidinone-(2)  
0.5 g cetyl stearyl alcohol  
0.1 g sodium lauryl sulphate  
15 0.6 g stearyl alcohol oxethylated with 10 mol ethylene oxide  
0.3 g perfume oil  
0.5 g ammonium dihydrogen phosphate  
93.0 g water  
20 100.0 g

A and emulsion B are blended with each other shortly before use. The pH value of the ready to use preparation is 6.3. The pre-washed and towel-dried hair is wound onto permanent waving curlers and then thoroughly moistened with all the waving agent. Further treatment can take place as stated under Example 1.

## Example 3

## Permanent waving agent based on a thioglycolate

18.0 g aqueous ammonium thioglycolate solution (50%)  
35 4.0 g imidazolidinone-(2)  
4.0 g ammonium hydrogen carbonate  
0.3 g perfume oil  
0.5 g octyl phenol oxethylated with 20 ml ethylene oxide  
73.2 g water  
40 100.0 g

The pH value of the solution is 8.0.

The hair is premoistened with half the waving fluid, wound onto permanent waving curlers and further moistened with the remainder of the waving fluid. The hair is then covered with a plastic film and left for about 10 minutes without any supply of heat. The hair is then rinsed with water, oxidatively fixed as usual and given secondary treatment.

## Example 4

## Permanent waving medium based on thioglycolate

## A.

55 12.4 g addition compound of imidazolidinone-(2) and thioglycol acid

## B.

11.3 g 2-amino-2-methyl-1-propanol

A and B are dissolved in 45 ml of water shortly before use. The solution has a pH value of 9.2 and a free imidazolidinone-(2) content of 8.6% by weight. Application is as described under Example 2.

Manufacture of the addition compound: 8.6 g imidazolidinone-(2) are dissolved in 300 g isopropanol and mixed with 9.2 g thioglycol acid. The addition compound precipitates as a finely crystalline deposit. It can also be produced without solvents in that equimolar quantities of thioglycol acid and imidazolidinone-(2) is dissolved under heating at about 95°C and then left to cool. The addition compound has a melting point of 92°C.

Instead of A also 13.4 g of the addition compound of imidazolidinone-(2) and  $\beta$ -mercapto propionic acid may be used. Production is by mixing equimolar quantities of imidazolidinone-(2) with  $\beta$ -mercapto propionic acid and dissolving by heating to 50°C. After cooling, the addition compound (melting point 30°) is precipitated.

## Example 5

## Depilatory based on a thioglycolate or thiolactate

## A.

4.0 g calcium thioglycolate  
5.0 g imidazolidinone-(2)  
5.0 g calcium hydroxide  
3.0 g stearyl alcohol oxethylated with 20 mol ethylene oxide  
3.0 g stearyl alcohol  
2.0 g Vaseline  
0.5 g perfume oil  
77.5 g water  
100.0 g

The pH value of the cream amounts to 12.5.

## B.

4.6 g thiolactic acid  
6.0 g imidazolidinone-(2)  
8.2 g calcium hydroxide  
3.0 g stearyl alcohol oxethylated with 20 mol ethylene oxide  
3.0 g stearyl alcohol  
2.0 g Vaseline  
0.5 g perfume oil  
72.7 g water  
100.0 g

The pH value of the cream is 12.5.

The cream is applied 1 to 2 mm thick to the parts of the skin from which the hair is to be removed. After being allowed to act for

2 to 5 minutes, the cream is removed and the skin thoroughly rinsed with water.

#### Example 6

Depilatory based on strontium sulphide

5	7.0 g	powdered strontium sulphide (with a SrS content of 50%)
	10.0 g	imidazolidinone-(2)
	3.0 g	anhydrous sodium sulphate
	2.0 g	colloidal silicic acid
10	0.5 g	perfume oil
	77.5 g	kaolin
	100.0 g	

5 g of the powder is mixed to a creamy paste with 5 ml of water shortly before use. The pH value of the preparation is 12.5. Application is as indicated under Example 4.

#### Example 7

Lye-based hair straightener

20	3.0 g	sodium hydroxide
	6.0 g	imidazolidinone-(2)
	9.0 g	cetyl stearyl alcohol
	1.0 g	sodium lauryl sulphate
	6.0 g	bentonite with a high content of montmorillonite
25	0.3 g	perfume oil
	74.7 g	water
	100.0 g	

The pH value of the cream is 12.6.

The cream is applied to the crinkly hair and evenly distributed. While being allowed to act for about 10 minutes, the hair is combed smooth several times and is afterwards thoroughly rinsed with water.

#### Example 8

Skin treatment medium

35.0 g	aqueous ammonium sulphite solution (33%, pH 6.5)	35
20.0 g	imidazolidinone-(2)	
1.5 g	tylose	
0.5 g	perfume oil	40
5.6 g	isopropanol	
37.4 g	water	
100.0 g		

The gel-form agent has a pH value of 6.5. This agent is rubbed into the hands and left to act for approx. 2 minutes. The hands are then rinsed thoroughly with water. The skin will have a rejuvenated appearance, because it is smooth, shining and of a fresh colour.

All the percentages given in the present Application are intended to represent percentages by weight.

#### WHAT WE CLAIM IS:—

1. A cosmetic comprising an aqueous preparation based on a keratin softening active substance and on a swelling and penetrating agent, characterised in that it contains, as the swelling and penetrating agent, imidazolidinone-(2).
2. A cosmetic according to Claim 1, containing at least one conventional additive.
3. A cosmetic substantially as hereinbefore described with reference to any one of the Examples.

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